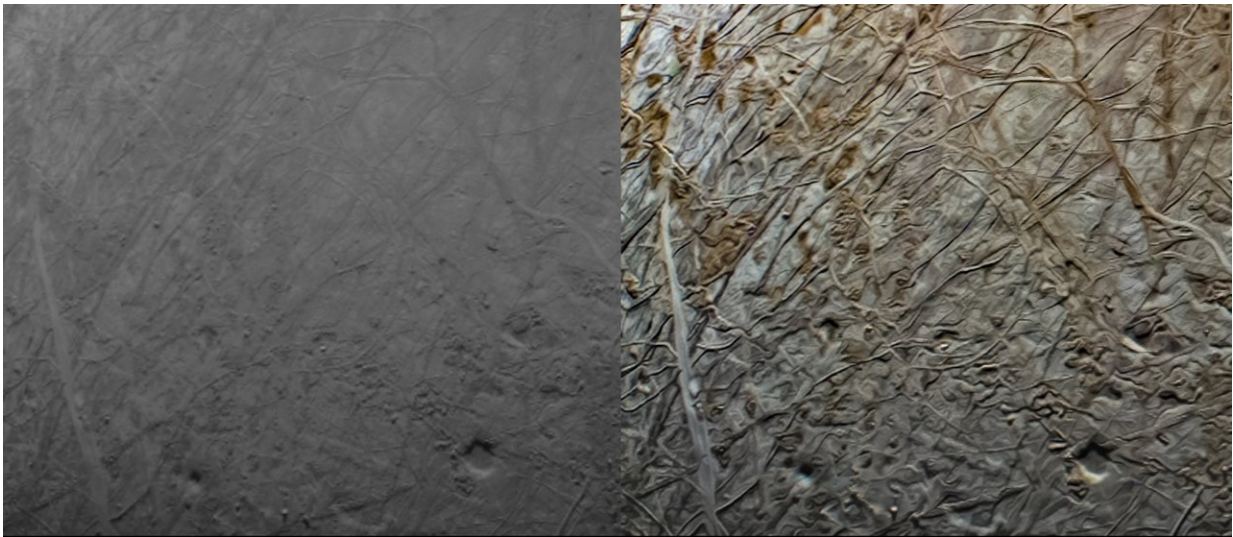


Citizen scientists enhance new Europa images from NASA's Juno

October 7 2022



This pair of images shows the same portion of Europa as captured by the Juno spacecraft's JunoCam during the mission's Sept. 29 close flyby. The image at left was minimally processed. A citizen scientist processed the image at right, and enhanced color contrast causes larger surface features to stand out. Credit: Image data: NASA/JPL-Caltech/SwRI/MSSS. Image processing: Navaneeth Krishnan S © CC BY

Citizen scientists have provided unique perspectives of the recent close flyby of Jupiter's icy moon Europa by NASA's Juno spacecraft. By processing raw images from JunoCam, the spacecraft's public-engagement camera, members of the general public have created deep-

space portraits of the Jovian moon that are not only awe-inspiring, but also worthy of further scientific scrutiny.

"Starting with our flyby of Earth back in 2013, Juno [citizen scientists](#) have been invaluable in processing the numerous images we get with Juno," said Scott Bolton, Juno principal investigator from the Southwest Research Center in San Antonio. "During each flyby of Jupiter, and now its moons, their work provides a perspective that draws upon both science and art. They are a crucial part of our team, leading the way by using our images for new discoveries. These latest images from Europa do just that, pointing us to surface features that reveal details on how Europa works and what might be lurking both on top of the ice and below."

JunoCam snapped four photos during its Sept. 29 flyby of Europa. Here's a detailed look:

Europa up close

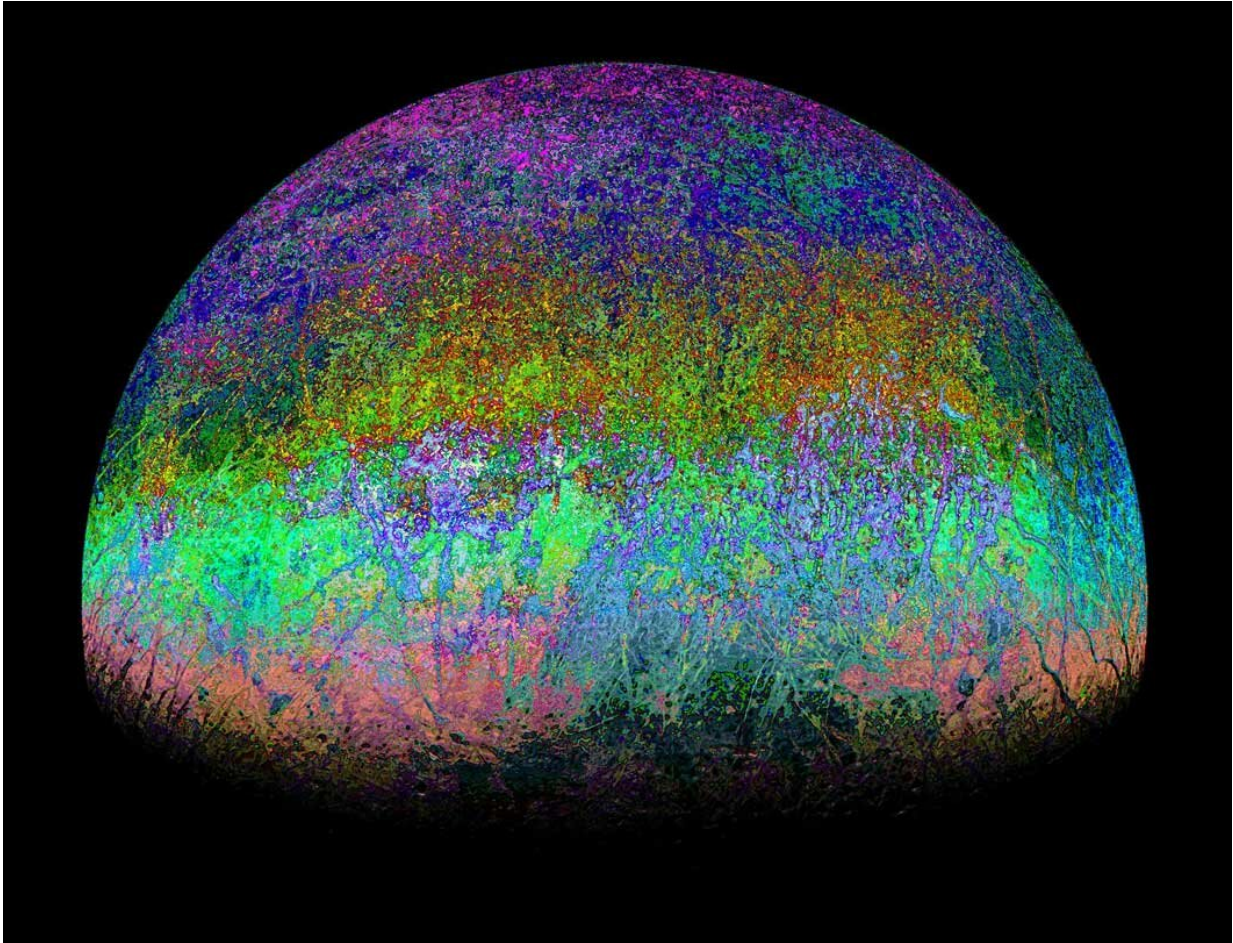
JunoCam took its closest image at an altitude of 945 miles (1,521 kilometers) over a region of the [moon](#) called Annwn Regio. In the image (not shown), terrain beside the day-night boundary is revealed to be rugged, with pits and troughs. Numerous bright and dark ridges and bands stretch across a fractured surface, revealing the tectonic stresses that the moon has endured over millennia. A circular dark feature in the lower right is Callanish Crater.

Such JunoCam images help fill in gaps in the maps from images obtained by NASA's Voyager and Galileo missions. Citizen scientist Björn Jónsson processed the image to enhance the color and contrast. The resolution is about 0.6 miles (1 kilometer) per pixel.

Science meets art

JunoCam images processed by citizen scientists often straddle the worlds of science and art. In the image at right, processed by Navaneeth Krishnan, the enhanced color contrast causes larger surface features to stand out more than in the lightly processed version of the image above (left). An example of the results can be seen in the lower right of the enhanced image, where the pits and a small block cast notable shadows. Small-scale texturing of the surface in the image needs to be carefully studied to distinguish between features and artifacts from processing, but the image draws us deeper into Europa's alien landscape.

"Juno's citizen scientists are part of a global united effort, which leads to both fresh perspectives and new insights," said Candy Hansen, lead co-investigator for the JunoCam camera at the Planetary Science Institute in Tucson, Arizona. "Many times, citizen scientists will skip over the potential scientific applications of an image entirely, and focus on how Juno inspires their imagination or artistic sense, and we welcome their creativity."



This highly stylized view of Jupiter's icy moon Europa was created by reprocessing an image captured by JunoCam during the mission's close flyby on Sept. 29. Credit: Image data: NASA/JPL-Caltech/SwRI/MSSS. Image processing: Kevin M. Gill / Fernando Garcia Navarro CC BY 2.0

Fall colors

Citizen scientist Fernando Garcia Navarro applied his artistic talents to create this image. He downloaded and processed an image that fellow citizen scientist Kevin M. Gill had previously worked on, producing a psychedelic rendering he has titled "Fall Colors of Europa."

The processed image calls to mind NASA's poster celebrating Juno's 2021 five-year anniversary of its orbital insertion at Jupiter.



National Aeronautics and Space Administration 

JULY 4th 2016 ORBIT INSERTION

NASA'S JUNO

MISSION

On July 4, 2016, NASA's Juno spacecraft arrived at Jupiter on a mission to peer through the gas giant planet's dense clouds and answer questions about the origins of our solar system. Since its arrival, Juno has provided scientists a treasure trove of data about the planet's origins, interior structures, atmosphere and magnetosphere. Juno is the first mission to observe Jupiter's deep atmosphere and interior, and will continue to delight with dazzling views of the planet's colorful clouds and Galilean moons. As it circles Jupiter, Juno provides critical knowledge for understanding the formation of our own solar system, the Jovian system and the role giant planets play in putting together planetary systems elsewhere.

www.nasa.gov 

www.nasa.gov/juno and missionjuno.swri.edu

NASA's poster celebrating Juno's 2021 five-year anniversary of its orbital insertion at Jupiter. Credit: NASA/JPL-Caltech

More groovy details about the flyby

With a relative velocity of about 14.7 miles per second (23.6 kilometers per second), the Juno spacecraft only had a few minutes to collect data and images during its close flyby of Europa. As planned, the gravitational pull of the moon modified Juno's trajectory, reducing the time it takes to orbit Jupiter from 43 to 38 days. The close approach also marks the second encounter with a Galilean moon during Juno's extended mission. The mission explored Ganymede in June 2021 and is scheduled to make close flybys of Io, the most volcanic body in the solar system, in 2023 and 2024.

Juno's observations of Europa's geology will not only contribute to our understanding of Europa, but also complement future missions to the Jovian moon. NASA's Europa Clipper mission, set to launch in 2024, will study the moon's atmosphere, surface, and interior, with a primary science goal to determine whether there are places below Europa's surface that could support life.

Provided by JPL/NASA

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